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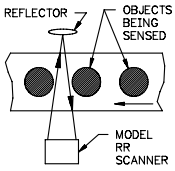
Bulletin No. PES-C
Drawing No. LP0023
Released 11/02

PHOTO-ELECTRIC SENSORS MODULATED L.E.D. DESIGN

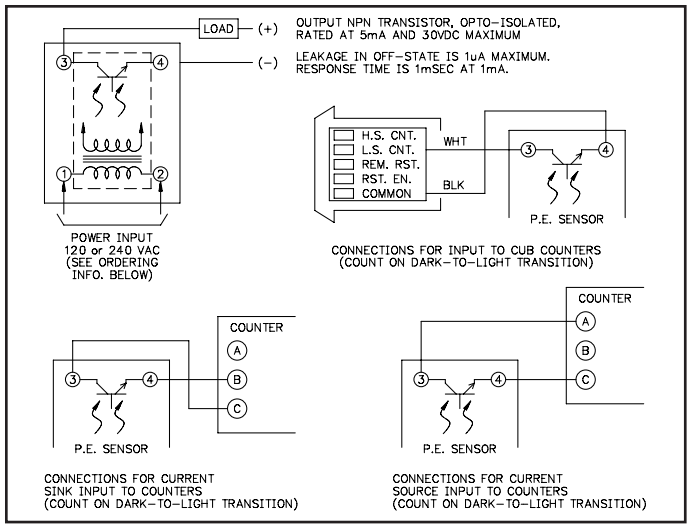
- REDUCES EFFECT OF DIRT & DUST BUILDUP
- ELIMINATES AMBIENT LIGHT INTERFERENCE
- ENDS LAMP REPLACEMENT

- *RUGGED CASE DESIGN*
  Encapsulated Circuitry in Valox Housing For Nema 1, 3, 4, 12 & 13 Environments
- *SPECIAL LOW-LEAKAGE OUTPUT*
  Can be Connected as a Current Source or Sink to all Red Lion Controls' Counters, Controls & Most Tachometers
- *L.E.D. SIGNAL STRENGTH INDICATOR*
  Blinks When Beam is in View at a Rate Proportional to Signal Strength. Ideal for Aligning & Monitoring Deterioration of Light Signal due to Dirt Buildup.
- *AVAILABLE IN 2 MODELS*
  Model PR - For Proximity Sensing
  Model RR - For Retro-Reflective Sensing

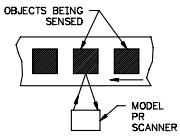
RETRO-REFLECTIVE SENSING - MODEL RR



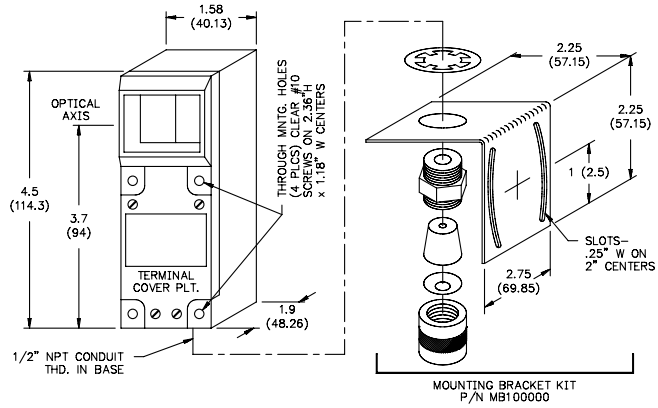
In Retro-reflective Sensing, the scanner directs its light beam at a reflector and detects the returning reflected light. Objects being sensed break the light beam. Retro-reflective scanning is useful for detecting large opaque objects with surfaces having low reflectance. Distance between reflector and scanner can vary from 1' to 10' using a 1½" Dia. prismatic reflector and up to 25' with a 3" Dia. reflector. Maximum distances should be reduced in areas where dirt and dust can settle on optic surfaces. Small objects can be sensed by reducing the reflector distance and masking the reflector. The sensitivity is adjusted to fall between the light level *"seen"* coming back from the reflector, and the residual reflected light *"seen"* when the object being sensed is in view. Retro-reflective scanning should not be used with glass, metal foil, or other objects having a high degree of surface reflectance. The output transistor turns ON when the scanner *"sees"* reflected light and turns OFF when beam breaks.



PROXIMITY SENSING - MODEL PR



In Proximity Sensing, the scanner light beam travels out in space and is lost with no object present. When an object moves into its field of view the reflected light from its surface is detected by the scanner. Scanning range is nominally 1" to 10" depending on the degree of reflectance of the object being sensed. The scanner uses infra-red light that is reflected from most surfaces; however, very dark objects may require very close range and flat black surfaces will not be detected at all. Background, behind objects to be sensed, must be taken into account and should either be moved a significant distance away or painted flat black. The sensitivity is adjusted to fall between the reflected light "seen" when an object is present and the residual reflected light from the background. The Model PR output transistor turns ON when an object is in view.



Scanners can be mounted by means of a bracket or plate bolted to the rear of the unit utilizing the four, #10 mounting bolt holes. This allows wiring to be run in ½" flex-conduit to the outlet in the base. As an alternate the Mounting Bracket kit can be used. This kit provides 2 degrees of freedom for easy alignment. Cable glands are supplied with the kit to accept cable from ¼" to 7/16" Dia.

ORDERING INFORMATION

MODEL NO.	DESCRIPTION	PART NUMBER
PR	Photo Electric Proximity Sensor	PR*00000
RR	Photo Electric Retro-reflective Sensor	RR*00000
RT1	1 ½" Prismatic Reflector For Use With Model RR	RT100000
RT2	3" Prismatic Reflector For Use With Model RR	RT200000
MB1	Mounting Bracket Kit For Use With Models PR & RR	MB100000

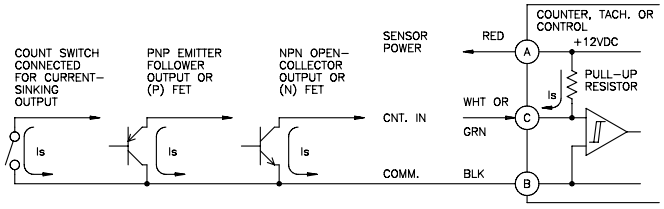
* Insert voltage code in this location of Part No: -1 for 120 VAC, -2 for 240 VAC. Term. Blocks are stamped to identify rated supply voltage; "PBOL" for 120 VAC; "PBOBL" for 240 VAC. Operating temperature range for Models PR & RR, -40° to +70°C.

INTERFACING SENSOR OUTPUTS

RLC Counters, tachometers, motion monitors, and controls accept a wide variety of sensor outputs including those supplied by others. To simplify the process of interfacing these outputs with counter, indicator and control inputs, sensor outputs have been broken down into the following classifications.

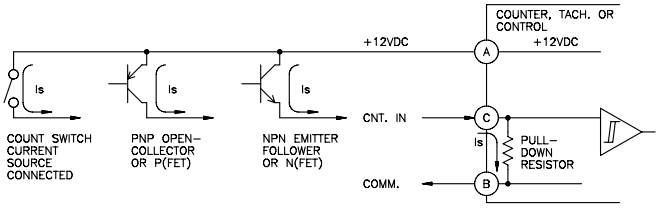
CURRENT-SINKING SENSOR OUTPUTS

A current-sink output drains current *(I_S)* from the input terminal and *"sinks" (shunts)* it to common. A *"pull-up"* resistor is required to serve as a load for a current-sink output. When the sensor output is *"OFF"* this resistor pulls the input terminal high, and when the output turns *"ON"* the input is pulled low.



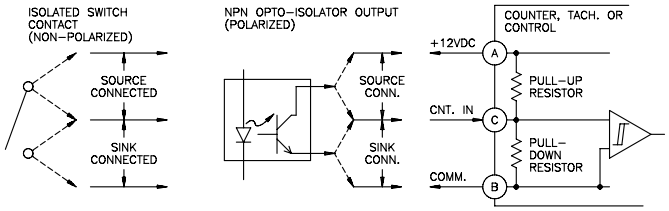
CURRENT-SOURCING SENSOR OUTPUTS

A current-source output supplies current *(I_S)* to the input terminal, acting as a *"source"* or current. A pull-down resistor is required for a current source load, and it pulls the input low when the sensor output is *"OFF"*. When the sensor output turns *"ON"*, it pulls the input high and the resistor provides a return current path to common.



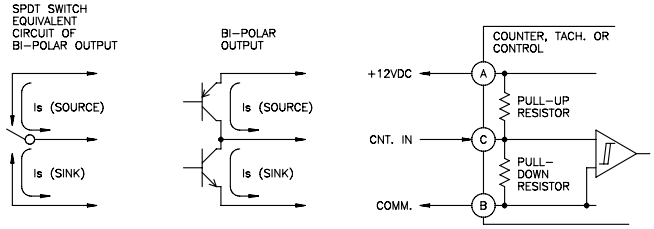
ISOLATED OR "FLOATING" OUTPUTS

Isolated outputs can be connected as either sink or source outputs since they have no fixed connection with either the +12 V supply or common lines. These outputs are further classified as either polarized or non-polarized. With polarized isolated outputs, proper polarity must be observed when connecting.



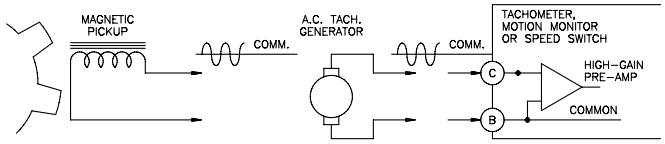
BI-POLAR OUTPUTS

Bi-Polar Outputs *"Sink"* current from the input terminal when the output voltage is low and *"Source"* current into the input when the output voltage is high. Bi-Polar outputs can operate with or without pull-up or pull-down resistors in the input circuit, since the output supplies a current path either way.



A.C. OUTPUTS
(From Conventional Mag. Pickups, Tach. Generators, etc.)

A.C. output signals swing positively and negatively about common and are limited to speed-related indicator and control inputs. They are not directly compatible with counter inputs. *(The LMPC and ASTC convert A.C. outputs to a current-sink output that may be applied directly to counter inputs provided the low-speed limitations of magnetic sensing are acceptable).*

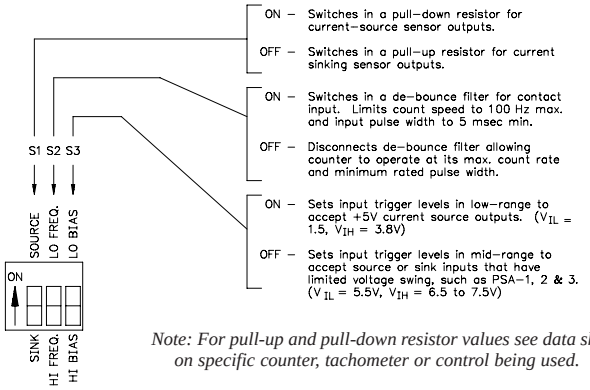


INPUT PROGRAMMING FOR COUNTERS, TACHOMETERS, MOTION MONITORS, & ACCESSORIES

All RLC Counters and Tachometers with programmable inputs are set-up by 3 switches that configure the input circuit to accept the required sensor output. Counter set-ups differ from those of tachometers since counters must also accept inputs from count switches *(requiring de-bounce)*, while tachometer inputs must additionally accommodate A.C. outputs. Both must accept conventional sink/source outputs.

COUNTER INPUT PROGRAMMING

The 3 set-up switch arrangement used on counters is shown at right. The nomenclature on these switches varies somewhat depending on the counter series, but the S1, 2 and 3 sequence and the ON/OFF functions are the same for all.



Note: For pull-up and pull-down resistor values see data sheet on specific counter, tachometer or control being used.

TACHOMETER & MOTION MONITOR INPUT PROGRAMMING

Tachometers, like counters and accessories, also use three set-up switches to configure the input circuit to the particular sensor output needed. However, in this case the individual switches do not all have clearly defined separate functions, but must be set-up in combination as shown at right. Nomenclature for each switch may also vary somewhat between various series; however, the S1, 2 & 3 sequence and ON/OFF set-ups are the same for all tachometers and motion monitors.